(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 0 703 831 B1

(12) **EUROPEAN PATENT SPECIFICATION**

(45) Date of publication and mention of the grant of the patent:
23.12.1998 Bulletin 1998/52

(21) Application number: **95917839.3**

(22) Date of filing: **03.04.1995**

(51) Int. Cl.[6]: **B05B 7/00**, B05B 11/00

(86) International application number:
PCT/CA95/00175

(87) International publication number:
WO 95/26831 (12.10.1995 Gazette 1995/43)

(54) LIQUID DISPENSER FOR DISPENSING FOAM

FLÜSSIGKEITSSPENDER ZUR AUSGABE VON SCHAUM

DISTRIBUTEUR DE MOUSSE

(84) Designated Contracting States:
AT BE CH DE DK ES FR GB GR IE IT LI LU MC NL PT SE
Designated Extension States:
LT SI

(30) Priority: **05.04.1994 US 223148**

(43) Date of publication of application:
03.04.1996 Bulletin 1996/14

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EP-A- 0 392 238
EP-A- 0 565 713
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GB-A- 2 193 904

EP 0 703 831 B1

Description

FIELD OF THE INVENTION

The present invention relates to dispensers for liquids, and more particularly to dispensers which dispense the liquid as a foam.

BACKGROUND OF THE INVENTION

Liquid dispensers for dispensing soaps and the like are well known. A large number of dispensers for dispensing for example hand cleaning soaps dispense the liquid itself. In many applications it is preferable to dispense the soap in the form of a foam. Foams tend to be much easier to spread than the corresponding liquid and in addition there is much less waste due to splashing or run-off since the foam has a much higher surface tension than the liquid. A foam requires much less liquid to produce the same cleaning power as obtained with the un-foamed liquid due to the much higher surface area of the former.

Known prior art foaming devices are generally of two types. In the first type of foamer, such as disclosed in United States Patent Nos. 4019657 and 3709437 the foam is produced by a jet of air. A disadvantage of this first type of foamer is that the quality of the foam varies as the dispensing force is varied.

The second type of foam dispenser, as disclosed in United States Patent Nos. 3422993 and 3985271 uses a porous material through which the foamable liquid is pumped thereby mixing the liquid with air to form the foam. Drawbacks to this type of foamer is that a considerable amount of pressure is required to force the liquid through the porous material. A further drawback to both types of foam dispensers is that the foamer is located at the top of the dispenser and a tube extends down to the bottom of the liquid storage container so that considerable force must be applied to pump the liquid up into the foamer and to dispense it therefrom.

Examples of other dispensers constructed on this principle are disclosed in EP-A-392 238, EP-A-565 713 and EP-A-618 147 are all directed to liquid dispensers comprising a bottle with a hand operated pump in the neck of the bottle. Each of the devices disclosed in these references include a hose which extends to the bottom of the bottle so that the liquid must be pumped up against gravity into the mixing chamber. As stated above, a major disadvantage to these configurations is that as the liquid is depleted greater force must be exerted in the pumping procedure in order to raise the liquid from the bottom of the container during dispense the liquid.

In many of the prior art foaming devices the foamer unit is separate from the container holding the liquid. When the liquid container is replaced the operator generally has to interconnect the foamer unit with the liquid container which can be an inconvenience. It would therefore be advantageous to provide a foam dispenser which allows convenient and rapid replacement of the liquid container in the dispenser.

Liquid detergents or soaps for hand cleaning generally require preservatives to increase shelf life of the detergent. Antioxidants are typically present as a additive to reduce oxidation of the soap in the presence of air normally present in the soap container and this adds to the cost of the soap. In the presence of air many soaps tend to thicken which requires increasing force to dispense the liquid. The thickened liquid is prone to clogging up the dispensing pathway. The dispenser bottles disclosed in EP-A-392 238, EP-A-565 713 and EP-A-618 147 are all vented to prevent negative pressure in the bottles from building up as liquid is pumped out of the bottles.

Accordingly, it would be advantageous to provide a dispenser which produces and dispenses a liquid in the form of foam and in which the liquid is not exposed to air until expelled from the liquid container portion of the dispenser.

SUMMARY OF THE INVENTION

The present invention provides a device for producing and dispensing foam. The foam pump includes a container a collapsible container (30) having an interior (32) and a throat (34). The foam pump includes a pump means (36) attached to said container (30). The pump means (30) including a first enclosure member (40) sealed in the throat (34) in air-tight relation, a second enclosure member (88) engaged in the first enclosure member (40) and telescopingly movable therein. The first and second enclosure members (40, 88) cooperate to define an air chamber (104) and fluid chamber (50, 70). The air chamber (104) includes an air inlet and outlet (76), the fluid chamber (50, 70) includes a fluid outlet (87) positioned with respect to the air outlet (76) so that liquid exiting the fluid outlet (87) intersects air exiting through air outlet (76). The fluid chamber (50, 70) has a liquid inlet (44) in flow communication with the container interior (32) and a liquid inlet valve (52) movable between an open position to allow liquid from the container (30) to enter the fluid chamber (50, 70) and a closed position. A liquid outlet valve (80) located in the fluid chamber portion (70). The liquid outlet valve (80) is biased in the closed position and pump means (36) including a porous member (84) far generating turbulence in fluid passing therethrough located in passageway (98) to receive air and fluid from the air chamber outlet (76) and fluid chamber outlet (87) respectively. Moving second enclosure member (88) towards first enclosure member (40) pressurizes air in air chamber (104) and liquid in fluid chamber (50, 70), whereby when the fluid chamber (50,70) is sufficiently pressurized the liquid inlet valve (52) closes and the liquid outlet valve (80) opens thereby forcing liquid through the fluid chamber outlet (87) to commingle with air being

simultaneously expelled through the air chamber outlet (76) which is forced through said porous member (84) to form a foam expelled out passageway 98.

In further aspects of the invention there is provided a dispenser for producing and dispensing foam including the above features and other features according to preferred embodiments of the invention. The dispenser includes a container for storing a liquid in the interior thereof. The dispenser includes pump means attachable to the container. The pump means includes an air chamber having an air inlet and air outlet. The pump means includes a fluid chamber provided with a fluid outlet positioned with respect to the air outlet so that liquid exiting the fluid outlet communicates with the air outlet. The fluid chamber has a liquid inlet in flow communication with the container interior and includes a liquid inlet valve, the liquid inlet valve being movable between an open position to allow liquid from the container to enter the fluid chamber and a closed position. The pump means includes a liquid outlet valve located in the fluid chamber spaced from the liquid inlet valve. The liquid outlet valve is biased in the closed position. The pump means includes a porous member for generating turbulence in fluid passing therethrough and the porous member is positioned to receive air and fluid from the air and fluid chamber outlets. The pump means includes means for pressurizing the air chamber and the fluid chamber whereby when the fluid chamber is sufficiently pressurized the liquid inlet valve closes and the liquid outlet valve opens thereby forcing liquid through the fluid chamber outlet to commingle with air being simultaneously expelled through the air chamber outlet. The resulting liquid-air mixture is forced through said porous member. The dispenser includes a housing, the container with attached pump means being releasably insertable into the housing. The housing includes a lever attached to the housing and movable with respect thereto. The pump means is operably coupled to the lever so that moving the lever pressurizes the air and fluid chambers simultaneously.

BRIEF DESCRIPTION OF THE DRAWINGS

The following is a description, by way of example only, of the liquid dispenser for dispensing foam forming the present invention, reference being had to the accompanying drawings, in which:

Figure 1 is a perspective view of a dispenser housing constructed in accordance with the present invention;

Figure 2 is a perspective view of a liquid container and foam pump attached thereto;

Figure 3 is an exploded perspective view of the foam pump of Figure 2;

Figure 4 is a cross sectional view taken along the line 4-4 of Figure 3 when the foam pump is assembled and with the pump in the unactuated position;

Figure 5 is a view similar to Figure 4 but showing the pump in the actuated position for expelling foam from the dispenser;

Figure 6 is a sectional view along the line 6-6 of Figure 1;

Figure 7 is a sectional view similar to Figure 6, but broken away and showing the pump in the depressed position; and

Figure 8 is a perspective view, broken away, of a portion of the dispenser housing containing the foam pump.

DETAILED DESCRIPTION OF THE INVENTION

Referring first to Figure 1, a liquid dispenser containing a dispenser constructed in accordance with the present invention is shown generally at 10. Dispenser 10 includes a housing 12 enclosing an upper liquid dispenser compartment 14 and a lower compartment 16 housing a foam producing pump to be discussed below. A hand actuated lever or pushbutton 18 is pivotally attached to lower compartment 16. An aperture 20 is located in the side of housing 12 for allowing access to a locking mechanism which locks the generally rectangular housing to a back plate (not shown) which is secured to a support surface such as a wall. A view port 28 is provided on the front of housing 12 for viewing the liquid level in the liquid container.

Dispenser 10 is designed to releasibly receive therein a liquid container shown generally at 30 in Figure 2 comprising a liquid storage compartment 32 and a liquid outlet 34. Attached to the liquid outlet 34 of container 30 is a foam pump shown at 36. Container 30 is a flexible plastic container for holding liquids such as soap and the like and is collapsible. Container 30 is gusseted along the sides 38 thereof so that as liquid is drained the container collapses along creases 39 to form an I beam section. A view port 28 is provided on the front of housing 12, best seen in Figure 1, for viewing the liquid level in liquid container 30 when the latter is assembled with the housing.

The exploded view of Figure 3 illustrates the components from which foam pump 36 is constructed and Figures 4 and 5 illustrate the assembled foamer in the two extreme positions. Foam pump 36 includes a cup-shaped enclosure member 40 having a top portion 42 with an aperture 44 centrally located therein. Enclosure 40 includes a shoulder 46 against which the edge of throat 34 of container 30 (shown in ghost outline) abuts when pump 36 is assembled with container 30. Aperture 44 forms a fluid inlet for liquid entering pump 36 from compartment 32 to be discussed later. A conduit 48 (visible only in Figures 4 and 5) is attached to the top portion 42 on the interior of enclosure member 40 and encloses a passageway 50.

Foam pump 36 is provided with an inlet valve 52 comprising a valve stem 54 and a valve head 56. Stem 54 is in the shape of a tuning fork with two spaced arms

58 depending from head 56 and defining a slot 60 therebetween. The end portions of arms 58 spaced from valve head 56 are provided with shoulders 62. When assembled as seen in Figures 4 and 5, inlet valve 52 is located in aperture 44 and retained therein by shoulders 62 and valve head 56 extending laterally beyond the edge of the aperture.

Foam pump 36 includes a piston 66 provided with a shaft 68 having a passageway 70 extending therethrough. Shaft 68 is attached to a piston head 72 at one end thereof and is provided with an O-ring groove 74 adjacent the other end thereof. Passageway 70 extends through piston head 72. Air vent inlet and outlet holes 76 are shown disposed about piston head 72 which extend through the head. Extending circumferentially around piston head 72 is a rib 78.

Pump 36 includes an outlet valve 80, an associated spring 82 and a wire gauze, grid or mesh 84. Mesh 84 may be fabricated of plastic, wire or cloth material. Mesh 84 produces turbulence in the air-liquid mixture to aid in foam production. The portion of passageway 70 located in piston head 72 is tapered and of larger diameter than the portion extending through shaft 68 to act as a valve seat 86 for valve 80.

Pump 36 further includes a conically shaped hollow member 88 having an upper cylindrical section 90, a conical section 92, a lower cylindrical section 94 provided with a circumferential rib 96 and a passageway 98. A protective cap or dust cover 100 having a cylindrical section 102 is provided as a cover for passageway 98.

Referring to Figure 4, a web 106 is located on the interior of conical member 88 in the lower cylindrical section 94 and extends inwardly to act as a support for grid 84. Thus, when pump 36 is assembled as seen in Figures 3 and 4, grid 84 is supported on web 106 and piston 66 is pressed down into cylindrical section 94 and positioned and locked in place by rib 78 snapping into internal circumferential groove 79. Spring 76 bears against mesh 84 but is supported by web 106 and the spring and outlet valve 80 are located in passageway 70 with the valve bearing against valve seat 86 in the closed position. Piston head 72 is provided with a fluid chamber outlet such as a channel 87 directed at right angles to channel 70 which is adjacent to and intersects air outlets 76.

Conically-shaped member 88 is received within cup-shaped member 40 whereby the diameter of cylindrical section 90 is chosen to ensure a friction fit but which allows member 88 to be moved in and out with respect to section 40. Shaft 68 is received within conduit 48 and an O-ring 110 seated in O-ring groove 74 provides a seal between the outer surface of shaft 68 and the inner wall of conduit 48. Protective cap 100 (Figure 3) is inserted into cup-shaped member 40 where cylindrical section 102 is the same diameter as section 90 so that it is received within cup-shaped member 40 and retained therein by a friction fit.

The outer diameter of cup-shaped member 40 and the inner diameter of throat 34 of liquid container 30 are chosen so member 40 can be inserted into the throat with a snug fit with the throat edge bearing against shoulder 46, Figure 4. Cup-shaped member 40 is then welded to container 30 to permanently attach it thereto. Conically-shaped member 88 and cup-shaped member 40 when assembled define an air chamber 104 separate from both fluid chamber 50 and the interior of liquid storage compartment 32 of container 30. In this way the air used to mix with the liquid to form the foam is imported from the exterior of the container. The inner diameter of cup-shaped member 40 and the outer diameter of cylindrical section 90 are chosen to produce a substantially air-tight connection so that air chamber 104 can be pressurized by pushing member 88 inwardly into member 40.

The combination of assembled container 30 and foam pump 36 may be used alone in a manner to be described below or alternatively may be used in conjunction with dispenser housing 12. Figure 6 illustrates a cross sectional view of housing 12 incorporating assembled container 30 and pump 36. With reference to Figures 6 to 8, lower compartment 16 of housing 12 is defined by side walls 120 and a front wall 122 having a generally rectangular aperture 124 located therein. Pushbutton 18 is pivotally connected to side walls 120 at position 126 and may be rotated about this pivotal connection. The ambit of this rotational movement is best seen by comparing the pushbutton positions in Figures 6 and 7 so that in the former, pushbutton 18 is fully extended and in Figure 7 it is fully depressed.

A pair of arms 130 are slidably movable in channels 132 formed in the interior of pushbutton 18 at the edges thereof. The other ends of arms 130 are received into slots 134 located in sleeves 136 which fit over the upper end of posts 138. Posts 138 pass through holes located in a yoke-shaped support bracket 140 rigidly attached to back wall 142 of the housing. Extending about the inner edge of the circular cut-out in bracket 140 is a slot 144. The other end of posts 138 opposed to the ends containing sleeves 136 are rigidly attached to a yoke shaped platform 146 containing a central cut-out 147 and an inwardly protruding shoulder 148. Each post 138 is provided with a spring 150 between bracket 140 and platform 146 to bias the platform down away from platform 140.

When pushbutton 18 is pushed in it pivots down about pivot point 126 thereby rotating arms 130 so that the ends of the arms in sleeves 136 move upwardly to pull posts 138 and platform 146 upwardly against springs 150. Releasing pushbutton 18 results in platform 146 being returned to the lowered position by the action of springs 150. As pushbutton 18 is moved, arms 130 slide in channels 132, compare Figures 6 and 7.

Platform 144 is provided with a pair of opposed bosses 160 each spring biased inwardly over shoulders 148 by springs 162. Bosses 160 travel in slots 164.

To insert assembled container 30 and pump 36 into housing 12, a key (not shown) is inserted into aperture 20 (Figure 2) to engage a locking mechanism 22 (Figure 6) and when unlocked, hook 24 is disengaged from catch 26 and the front portion of the housing is pivoted downwardly away from back wall 120. Referring to Figure 8, container 30 and foam pump 36 are then inserted into housing 12 with conical member 88 pushed up into section 40 and rib 46 is received by slot 144. Pushbutton 18 is then pushed inwards so that platform 146 is raised and when the convex inner surfaces of bosses 160 are engaged by rib 96 thereby pushing them outwardly against springs 162. When platform 146 has been raised high enough, bosses 160 snap over the top edge of rib 96 thereby locking conical member 88 with platform 146. When container 30 and foam pump 36 is assembled with dispenser housing 12 and pushbutton 18 is moved as described above, conically-shaped member 88 moves in and out of cup-shaped member 40 to create a pumping action.

In operation, to dispense foam from liquid from container 30 a user places the hand to receive foam under housing 12 adjacent to outlet 98 and with the other hand depresses pushbutton 18, see Figure 6. Referring now to Figure 4, with conical member 88 in the lowered position, inlet valve 52 is in the open position so that liquid flows into chamber 50 through slot 60 and aperture 44 in the direction of the arrows. Liquid fills chamber 50 and passageway 70 in piston 68. Outlet valve 80 is in the closed position being urged onto valve seat 86. When the user depresses pushbutton 18 conical member 88 is pushed up into cup-shaped member 40 thereby pressurizing air chamber 104 and the fluid chamber comprising chamber 50 and passageway 70. Upon pressurizing the fluid chamber, inlet valve 52 is pushed upwardly thereby closing off fluid inlet 44. Outlet valve 80 is forced open when the fluid chamber has been pressurized a predetermined amount as determined by the force of spring 82 to thereby supply fluid to the fluid outlet channel 87.

Air chamber 104 is being simultaneously pressurized as the volume is decreased so that air is forced (in the direction of the arrows shown) through holes 76 in piston head 72. Referring to Figure 5, once outlet valve 80 is opened, liquid is forced around the valve and is directed by outlet channel 87 to make a right angle turn and is directed into the air stream being forced out of air chamber 104. The air and liquid commingle and the mixture is forced through mesh 84 to produce foam. The foam is expelled through passageway 98 to the user's hand. The properties of the foam, ratio of liquid to air may be controlled by the mesh or grid 84 and the relative volumes of the air chambers and fluid chambers. A foam with an air to liquid ratio of 20:1 has been found to be quite useful when liquid hand soap is being dispensed.

When conically-shaped member 88 is urged back away from member 40 by springs 150, air is sucked back into air chamber 104 by being drawn back through outlet 98 and through air vents 76 and into the air chamber. Residual foam remaining in mesh 84 or outlet passageway 98 is then sucked back into air chamber 104 so that the foam pump is self cleaning. As member 88 is being urged back out of member 40, inlet valve 52 is pulled downwardly thereby opening inlet 44 and liquid is drawn into chamber 50 from container 30. Depressing pushbutton 18 repeats the foam production step described above.

Foam pump 36 is advantageous over prior art foamers because the same amount of pressure is required to operate the pump and produce the foam regardless of the amount of liquid in the container. Further, less work in general needs to be exerted since the liquid is not being forced up a tube or being forced through a thick porous plug. Also, the shape of the container is not restricted in shape by the need to hand squeeze it as with many of the prior art foamers. Another advantage of the foamer of the present invention is that the liquid is maintained in a relatively air-tight dispenser with no mixing with air until expelled from the fluid chamber. In this way long term oxidation of the ingredients making up the liquid is reduced. Every time a container is replaced, a new foam pump is provided with the container. This is advantageous since it avoids extended usage of the same pump so that problems such as blockage of passageways is avoided.

A further advantage of the foaming device disclosed herein is that the need for thick, rigid porous plugs for generating foam as found in many of the prior art devices is avoided. The thin mesh or grid 84 as illustrated is sufficient to generate foam of appropriate quality.

It will be appreciated that container 30 and foam pump 36, being fabricated of plastic, except for spring 82 (and possibly grid 84), may be readily recycled after the contents of container 30 have been consumed.

The combination of filled collapsible container 30 and foam pump 36 attached thereto (Figure 2) is preferably sold as a single unit (with cap 100) as a replacement charge for use with dispenser housing 12 in applications requiring fixed locations for the dispenser such as rest rooms, other sanitary stations and the like. Alternatively, it will be appreciated that the combination of container 30 and foam pump 36 may be used in applications where the user carries the unit about and hand pumps foam from the device. This is advantageous in for example hospitals where patients must be washed in bed. In such applications container 30 is held in one hand and conically-shaped member 88 is pumped with the other hand to dispense foam. For such applications, conically-shaped member 88 may be interlocked with cup-shaped member 40 by means of a boss and groove arrangement whereby a boss projects out from the side of cylindrical section 90 into a groove located on the interior surface of cup member 40. The groove would have two turns in it so that member 88 could not be

pulled out of member 40 without rotation.

Therefore, while the present invention has been described and illustrated with respect to the preferred and alternative embodiments, it will be appreciated that numerous variations of these embodiments may be made without departing from the scope of the invention as defined in the appended claims.

Claims

1. A foam pump (36) for producing and dispensing foam, comprising:

   a) a collapsible container (30) having an interior (32) and a throat (34); and
   b) pump means (36) attached to said container (30), the pump means (36) including a first enclosure member (40) sealed in said throat (34) in air-tight relation, a second enclosure member (88) engaged in said first enclosure member (40) and telescopingly movable therein, the first and second members cooperating to define an air chamber (104) and fluid chamber (50, 70), the air chamber (104) including an air inlet and outlet (76), the fluid chamber (50, 70) including a fluid outlet (87) positioned with respect to the air outlet (76) so that liquid exiting the fluid outlet (87) intersects air exiting through air outlet (76), the fluid chamber (50, 70) having a liquid inlet (44) in flow communication with the container interior (32) and a liquid inlet valve (52) movable between an open position to allow liquid from the container (30) to enter the fluid chamber (50, 70) and a closed position, a liquid outlet valve (80) located in the fluid chamber portion (70), the liquid outlet valve (80) being biased in the closed position, said pump means (36) including a porous member (84) for generating turbulence in fluid passing therethrough located in a passageway (98) to receive air and fluid from said air chamber outlet (76) and fluid chamber outlet (87) respectively, wherein moving second enclosure member (88) towards first enclosure member (40) pressurizes air in air chamber (104) and liquid in fluid chamber (50, 70), whereby when the fluid chamber (50, 70) is sufficiently pressurized the liquid inlet valve (52) closes and the liquid outlet valve (80) opens thereby forcing liquid through the fluid chamber outlet (87) to commingle with air being simultaneously expelled through the air chamber outlet (76) which is forced through said porous member (84) to form a foam expelled out passageway 98.

2. The foam pump (36) according to claim 1 wherein the first enclosure member (40) is provided with a conduit (48) defining passageway (50) extending from said fluid inlet (44), the second enclosure member (88) having a proximal end portion and a piston (68) extending from the proximal end portion and being receivable within said conduit (48), the piston (68) defining passageway (70) extending therethrough in flow communication with passageway (50) to define said fluid chamber (50, 70).

3. The foam pump (36) according to claims 1 or 2 wherein the inlet valve (52) includes a valve stem (54) attached to a valve seat (56), the valve stem (54) being located in the fluid inlet (44) and protruding into the interior (32) of container (30), the valve seat being located in the fluid chamber (50, 70), and wherein moving the second member (88) away from the first member reduces the pressure in the fluid chamber (50, 70) thereby drawing the inlet valve (52) to the open position and pumping liquid from the container (30) into the fluid chamber (50, 70), and wherein moving the second enclosure member (88) towards the first enclosure member (40) pressurizes the fluid chamber (50, 70) thereby forcing inlet valve (52) towards the container interior (32) so that the valve seat seals the fluid inlet (44).

4. The foam pump (36) according to claim 5 wherein said outlet valve (80) includes a spring (82) for urging the outlet valve (80) closed, and wherein the outlet valve (80) opens when the fluid chamber (50, 70) has been pressurized to a preselected pressure.

5. The foam pump (36) according to claim 1 wherein said porous member (84) is a mesh.

6. The foam pump (36) according to claims 1, 2, 3, 4 or 5 including a dispenser housing (12), the container (30) with attached foam pump means being releasably insertable into said housing (12), including a lever (130) attached to the housing (12) and movable with respect thereto, the second enclosure member (88) of the pump means being operably coupled to the lever (130) so that moving the lever moves the second member (88) with respect to the first member (40).

7. The foam pump according to claim 6 wherein the housing (12) includes bias means (150) for urging the second enclosure member (88) away from the first enclosure member (44).

8. The foam pump according to claim 7 wherein said lever is a push button pivotally attached to the housing, said housing including basing means for basing the second member away from said first member, whereby depressing the pushbutton causes the second member to move towards the first member,

and upon release of the pushbutton said basing means urges said second member away from the first member.

Patentansprüche

1. Schaumpumpe (36) zum Erzeugen und Ausgeben von Schaum mit

   a. einem zusammenfaltbaren Behälter (30) mit einem Innenraum (32) und einem Hals (34) und
   b. einer am Behälter (30) angebrachten Pumpanordnung (36) mit einem ersten Einfaßelement (40), das im Hals (34) luftdicht eingeschlossen ist, einem zweiten Einfaßelement (88), das in das erste Einfaßelement (40) eingesetzt und in ihm teleskopartig verschiebbar ist, wobei das erste und das zweite Element gemeinsam eine Luftkammer (104) und eine Fluidkammer (50, 70) umschließen und die Luftkammer (104) einen Lufteinlaß und -auslaß (76) und die Fluidkammer (50, 70) einen Fluidauslaß (87) aufweist, der bezüglich des Luftauslasses (76) so liegt, daß aus dem Fluidauslaß (87) austretende Flüssigkeit durch den Luftauslaß (76) austretende Luft schneidet, und wobei die Fluidkammer (50, 70) einen Flüssigkeitseinlaß (44) in Strömungsverbindung mit dem Behälterinneren(32) und ein Flüssigkeits-Einlaßventil (52) aufweist, das zwischen einer Offenstellung, in der es Flüssigkeit aus dem Behälter (30) in die Fluidkammer (50, 70) einströmen läßt, und einer Schließstellung schaltbar ist, weiterhin mit einem im Flüssigkeits-Auslaßventilkörper (80), der im Fluidkammerteil (70) angeordnet und in die Schließstellung vorgespannt ist, wobei die Pumpanordnung (36) ein poröses Element (84) zum Erzeugen von Turbulenz in dem durch es hindurchtretendem Fluid aufweist, das in einem Kanal (98) angeordnet ist, um Luft und Fluid aus dem Luftkammerauslaß (76) bzw. dem Fluidkammerauslaß (87) aufzunehmen, wodurch bei der Beaufschlagung mit ausreichend hohem Druck durch die Fluidkammer (50, 70) das Flüssigkeits-Einlaßventil (52) schließt und der Flüssigkeits-Auslaßventilkörper (80) öffnet, so daß Flüssigkeit durch den Fluidkammerauslaß (87) gedrückt wird, um sich mit der Luft zu vermischen, die gleichzeitig durch den Luftkammerauslaß (76) aus- und durch das poröse Element (84) gedrückt wird, um einen Schaum zu bilden, der aus dem Kanal (98) ausgegeben wird.

2. Schaumpumpe (36) nach Anspruch 1, bei der das erste Einfaßelement (40) mit einem Rohrstück versehen ist, das einen vom Fluideinlaß (44) her verlaufenden Kanal (50) umschließt, und das zweite Einfaßelement (88) einen proximalen Endabschnitt und einen von diesem abverlaufenden Kolben (68) aufweist, der vom Rohrstück (48) aufnehmbar ist, wobei der Kolben (68) einen Kanal (70) umschließt, der durch den Kolben verläuft und in Strömungsverbindung mit dem Kanal (50) steht, um die Fluidkammer (50, 70) zu bilden.

3. Schaumpumpe (36) nach einem der Ansprüche 1 oder 2, bei der das Einlaßventil (52) einen Ventilschaft (54) aufweist, der an einem Ventilsitz (56) befestigt ist, im Fluideinlaß (44) sitzt und in das Innere (32) des Behälters (30) hinein vorsteht, wobei der Ventilsitz in der Fluidkammer (50, 70) vorsteht und wobei beim Hinwegbewegen des zweiten Elements (88) vom ersten Element der Druck in der Fluidkammer (50, 70) sinkt, das Einlaßventil (52) in die Offenstellung und Flüssigkeit aus dem Behälter (30) in die Fluidkammer (50, 70) gezogen und beim Bewegen des zweiten Einfaßelements (88) zum ersten Einfaßelement (40) hin die Fluidkammer (50, 70) druckbeaufschlagt und so das Einlaßventil (52) zum Behälterinneren (32) hin gedrückt wird, so daß der Ventilsitz den Fluideinlaß (44) verschließt.

4. Schaumpumpe (36) nach Anspruch 5, bei der der Auslaßventilkörper (80) eine Feder (82) aufweist, die den Auslaßventilkörper (80) in den Schließzustand drückt, wobei das Auslaßventil (80) öffnet, wenn die Fluidkammer (50, 70) auf einen vorgewählten Druck beaufschlagt worden ist.

5. Schaumpumpe (36) nach Anspruch 1, bei der das poröse Element (84) ein Maschendrahtelement ist.

6. Schaumpumpe (36) nach einem der Ansprüche 1, 2, 3, 4 oder 5 mit einem Spendergehäuse (12), in das der Behälter (30) mit angesetzter Schaumpumpenanordnung lösbar einsetzbar ist, und mit einem Hebel (130), der an das Gehäuse (12) angesetzt und relativ zu ihm bewegbar ist, wobei das zweite Einfaßelement (88) der Pumpanordnung betrieblich mit dem Hebel (130) so gekoppelt ist, daß beim Bewegen des Hebels das zweite Element (88) bezüglich des ersten Elements (40) bewegt wird.

7. Schaumpumpe nach Anspruch 6, bei der das Gehäuse (12) eine Vorspanneinrichtung (150) aufweist, mit der das zweite Einfaßelement (88) vom ersten Einfaßelement (44) hinwegdrückbar ist.

8. Schaumpumpe nach Anspruch 7, bei der es sich beim Hebel um einen Drucktaster handelt, der schwenkbar am Gehäuse gelagert ist, und das Gehäuse eine Vorspanneinrichtung aufweist, mit

der das zweite Element vom ersten Element hinwegdrückbar ist, wobei beim Herabdrücken des Drucktasters das zweite Element sich zum ersten hin bewegt und beim Freigeben des Drucktasters die Vorspanneinrichtung das zweite Element vom ersten hinwegdrückt.

Revendications

1. Pompe à mousse (36) pour la production et la distribution de mousse comprenant :

   a) un conteneur (30) déformable possédant un volume intérieur (32) et un col (34) ; et
   b) un moyen de pompe (36) fixé au conteneur (30) le moyen de pompe (36) comprenant une première enceinte (40) solidarisée au col (34) de façon étanche à l'air, une seconde enceinte (88) venant s'engager dans la première enceinte (40) et mobile de façon télescopique dans celle-ci, les première et seconde enceintes coopérant entre elles pour délimiter une chambre à air (104) et une chambre à fluide (50, 70), la chambre à air (104) comportant un orifice d'entrée et de sortie (76), la chambre à fluide (50, 70) possédant un orifice de sortie (87) du fluide disposé par rapport à l'orifice de sortie d'air (76) de façon que le liquide sortant de l'orifice de sortie (87) du fluide traverse l'air sortant par l'orifice de sortie d'air (76), la chambre à fluide (50, 70) possédant un orifice d'entrée de liquide (44) en continuation fluidique avec l'intérieur (32) du conteneur et une valve d'entrée de liquide (52) mobile entre une position d'ouverture dans laquelle elle permet l'entrée du liquide provenant du conteneur (30) dans la chambre à fluide (50, 70) et une position de fermeture, une valve (80) de sortie de liquide située dans la section (70) de la chambre à fluide, cette valve (80) de sortie de liquide étant rappelée en position de fermeture, ledit moyen de pompe (36) comprenant une pièce poreuse (84) placée dans un passage (98) pour générer une turbulence dans le fluide traversant et recevant l'air et le fluide respectivement de l'orifice de sortie (76) de chambre à air et de l'orifice de sortie (87) de chambre à fluide, pompe dans laquelle le déplacement de la seconde enceinte mobile (88) mobile vers la première enceinte (40) comprime l'air dans la chambre à air (104) et le liquide dans la chambre à fluide (50, 70), dans laquelle lorsque la chambre à fluide (50, 70) est suffisamment comprimée, la valve d'entrée (52) de liquide se ferme et la valve de sortie (80) de liquide s'ouvre forçant ainsi le liquide à travers l'orifice de sortie (87) de la chambre à fluide pour s'intermélanger à l'air simultanément expulsé à travers l'orifice de sortie (76) de la chambre à air qui est forcé à travers la pièce poreuse (84) afin de former une mousse chassée par le passage (98).

2. Pompe à mousse (36) selon la revendication 1 caractérisée en ce que la première enceinte (40) comporte un conduit (48) formant un passage (50) s'étendant à partir de l'orifice (44) d'entrée de fluide, la seconde enceinte (88) possédant une extrémité rapprochée et un piston (68) s'étendant à partir de l'extrémité rapprochée et pouvant être reçu dans le conduit (48), le piston (68) définissant un passage (70) s'étendant au travers en communication fluidique avec le passage (50) pour délimiter la chambre à fluide (50,70).

3. Pompe à mousse (36) selon la revendication 1 ou 2 caractérisée en ce que la valve (52) de l'orifice d'entrée comprend une tige (54) de valve reliée à un siège (56) de valve, la tige (54) de valve étant placée dans l'orifice (44) d'entrée du fluide et faisant saillie dans le volume intérieur (32) du conteneur (30), le siège de valve étant placé dans la chambre (50, 70) à fluide, en ce que le déplacement de la seconde enceinte (88) en écartement par rapport à la première enceinte réduit la pression dans la chambre à fluide (50, 70) pour tirer ainsi la valve (52) d'orifice d'entrée dans sa position d'ouverture et pomper le liquide du conteneur (30) dans la chambre (50, 70) à fluide et en ce que le déplacement de la seconde enceinte (88) vers la première enceinte comprime la chambre (50, 70) à fluide en forçant la valve (52) d'orifice d'entrée vers le volume intérieur (32) du conteneur de façon que le siège de valve ferme hermétiquement l'orifice d'entrée (44).

4. Pompe à mousse (36) selon la revendication 5 caractérisée en ce que la valve (80) d'orifice de sortie comporte un ressort (82) pour rappeler la valve (80) d'orifice de sortie en position fermée et en ce que la valve (80) d'orifice de sortie s'ouvre lorsque la chambre (50, 70) de fluide a été comprimée à une pression prédéterminée.

5. Pompe à mousse (36) selon la revendication 1 caractérisée en ce que la pièce poreuse (84) est une structure de tamis.

6. Pompe à mousse (36) selon les revendications 1, 2, 3 ,4 ou 5 comprenant un carter distributeur (12), le conteneur (30) et le moyen de pompe à mousse qui lui est relié étant introduits de façon libérable dans le carter (12) comportant un levier (130) y relié et mobile par rapport à celui-ci, la seconde enceinte (88) du moyen de pompe étant couplée au levier (130) pour son actionnement de façon que le dépla-

cement du levier entraîne celui de la deuxième enceinte (88) par rapport à la première enceinte (40).

7. Pompe à mousse selon la revendication 6 caractérisée en ce que le carter (12) comprend un moyen de rappel (150) pour rappeler la seconde enceinte (88) en écartement par rapport à la première enceinte (44).

8. Pompe à mousse selon la revendication 7 caractérisée en ce que le levier est un bouton poussoir relié de façon pivotante au carter, le carter comprenant un moyen de rappel pour rappeler la seconde enceinte en écartement par rapport à la première enceinte et en ce que l'actionnement en appui sur le bouton poussoir provoque le déplacement de la seconde enceinte vers la première enceinte et dès la libération du bouton poussoir, le moyen de rappel rappelle la seconde enceinte en écartement de la première enceinte.

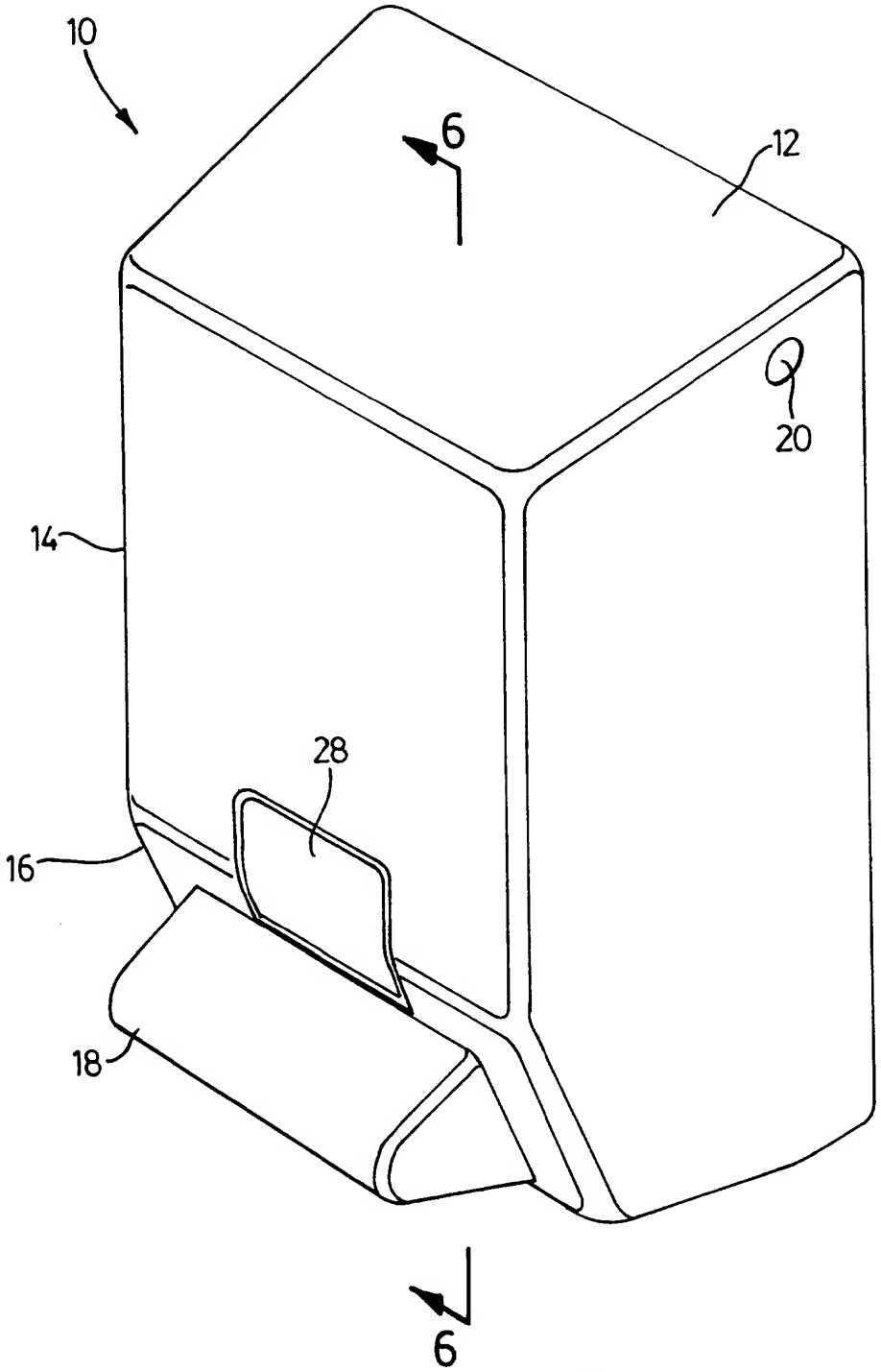


FIG. 1

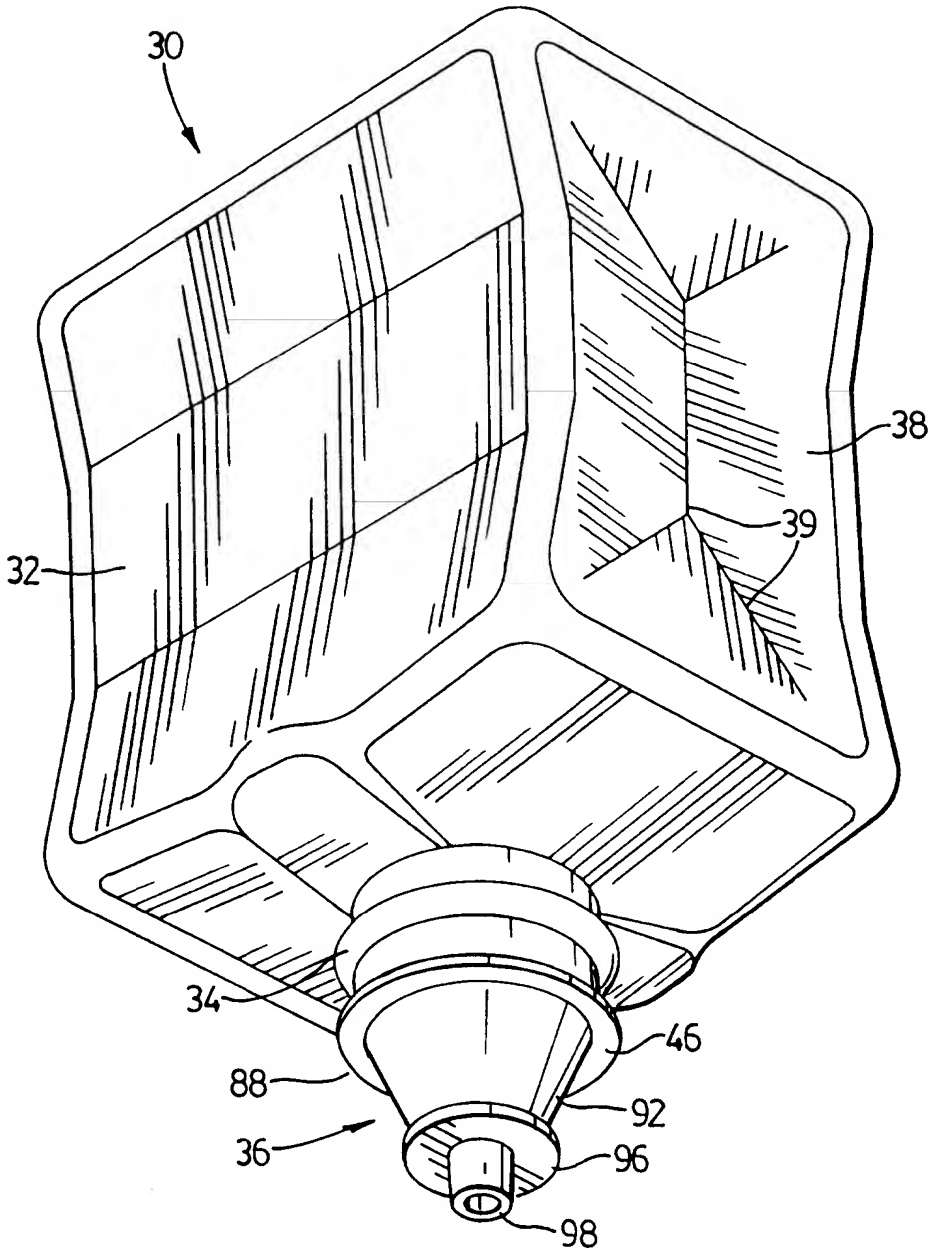
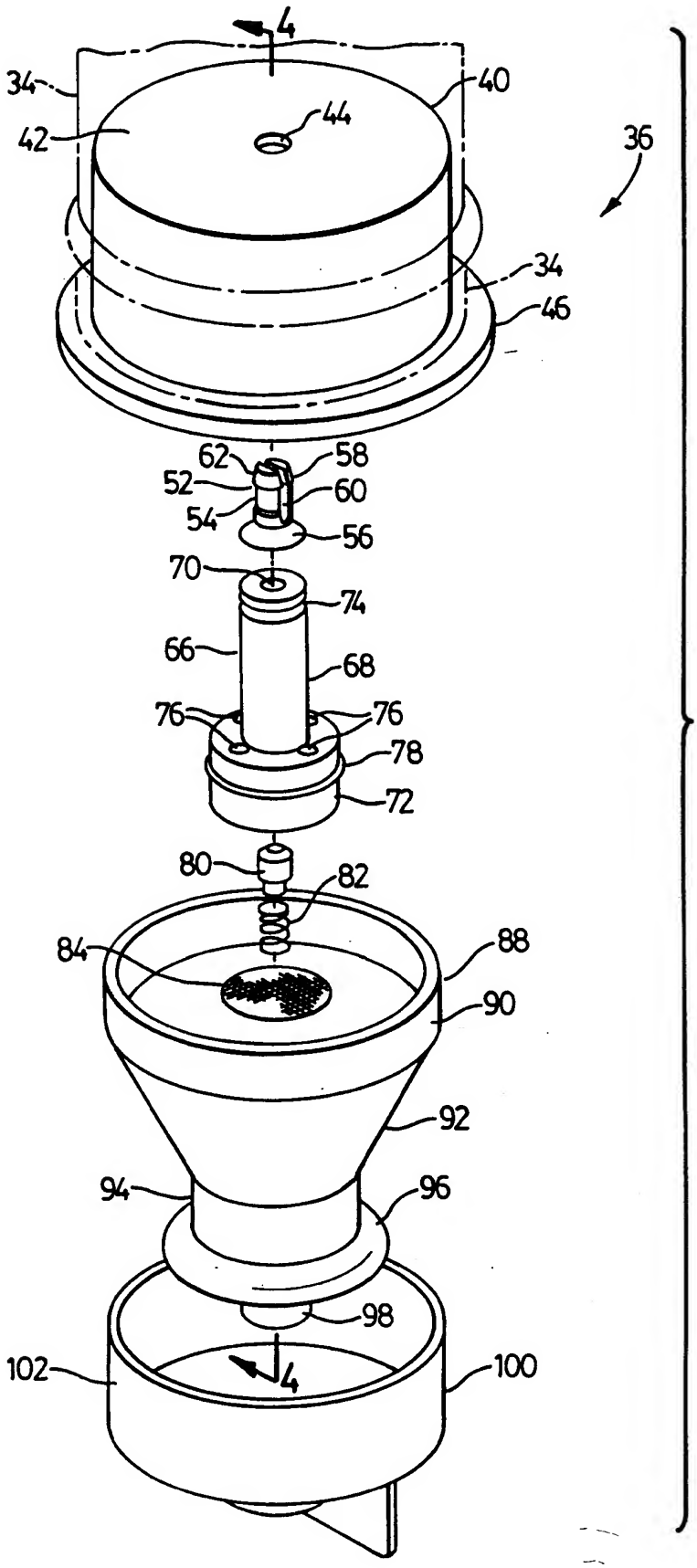


FIG. 2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102
100

FIG. 3

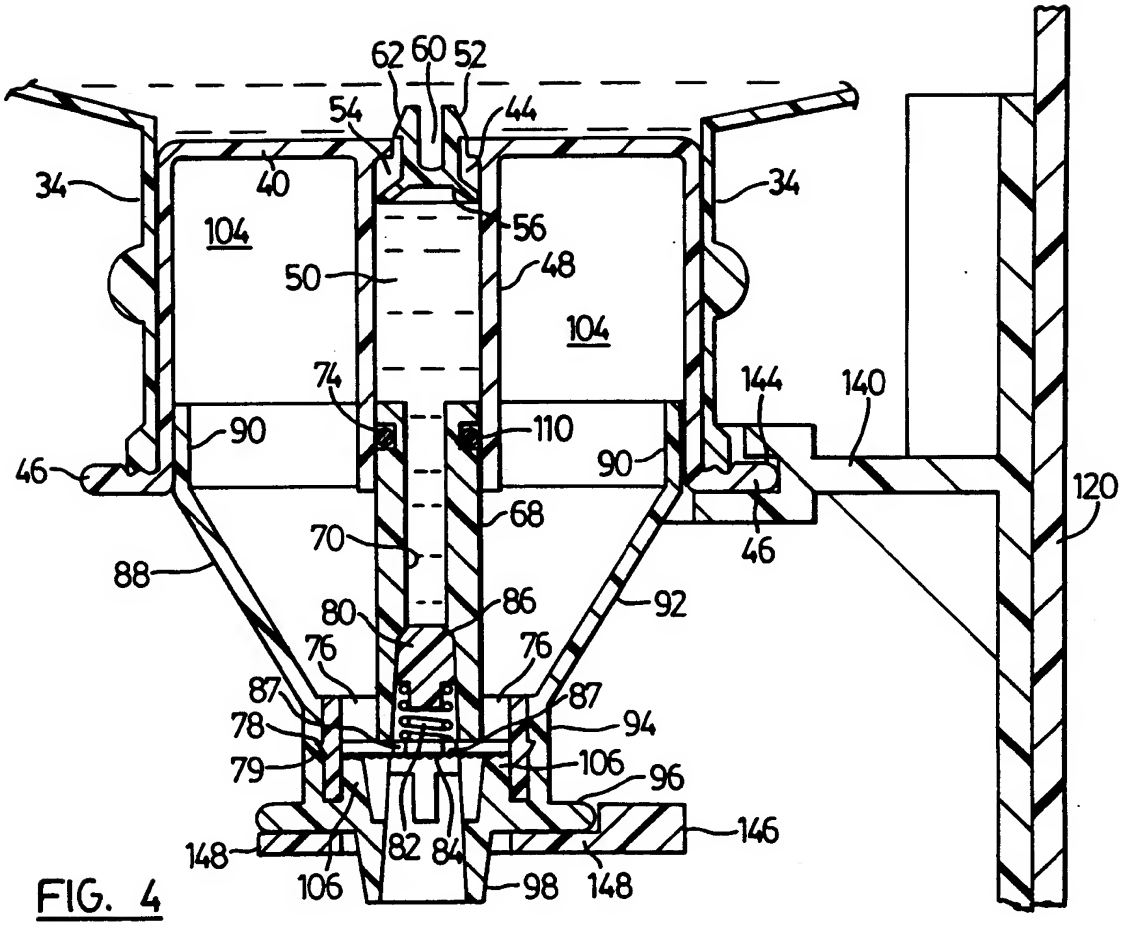
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FIG. 4

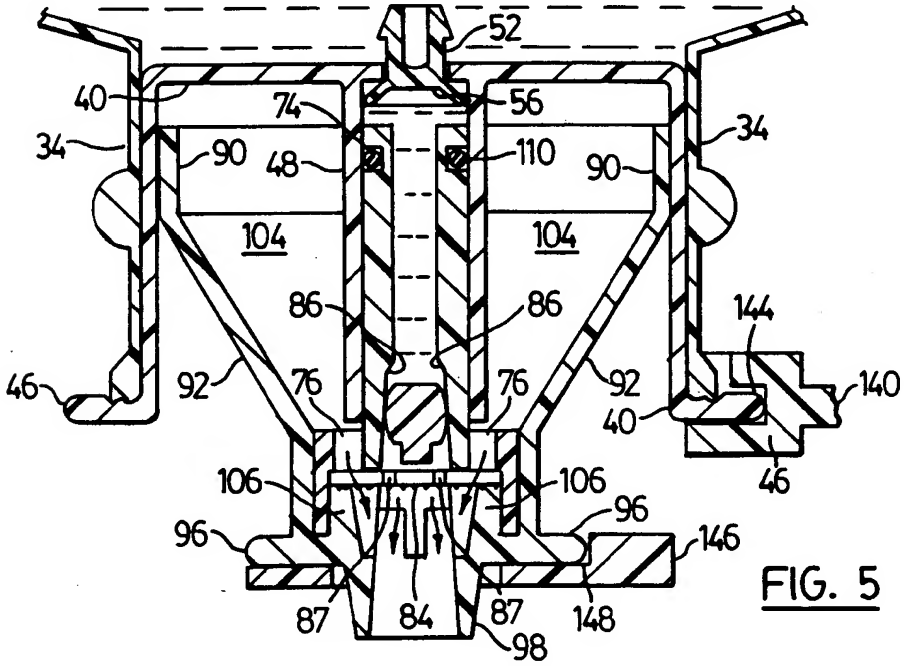
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FIG. 5

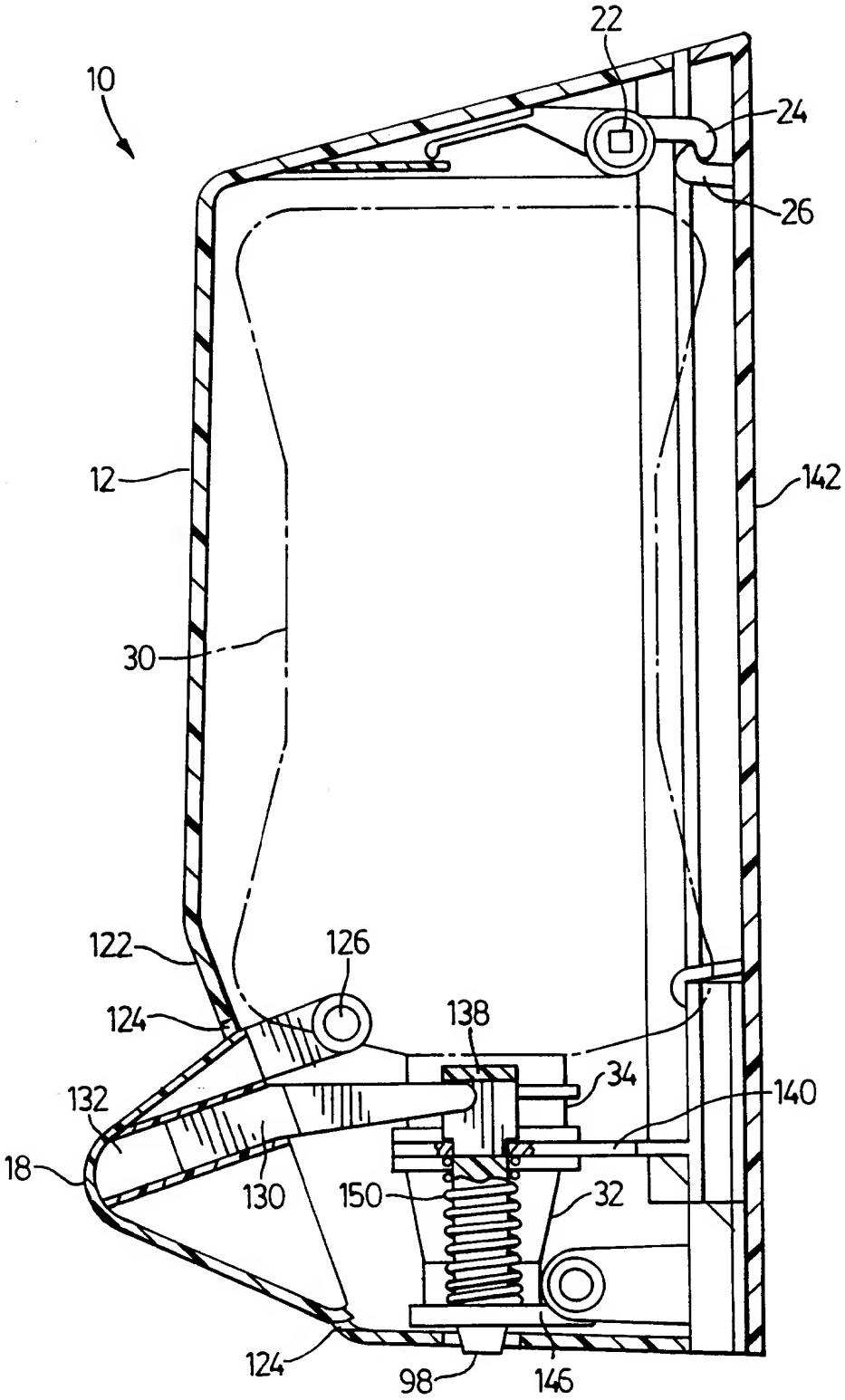
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FIG. 6

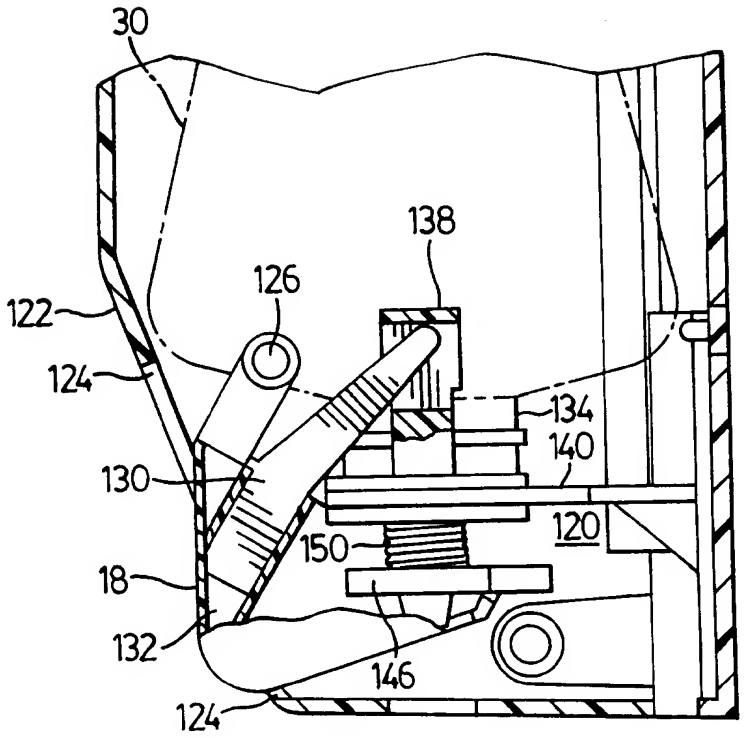

FIG. 7

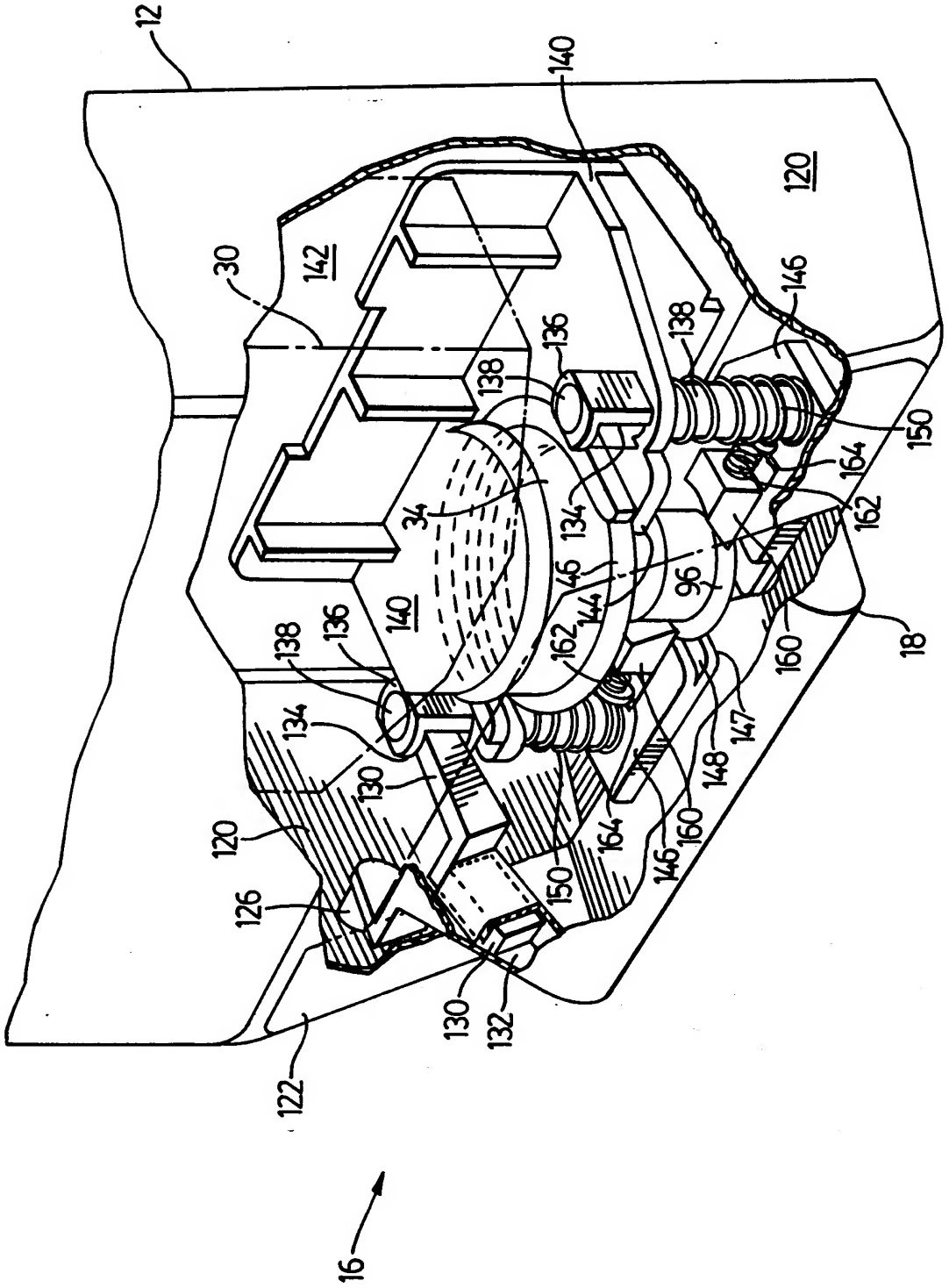
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FIG. 8